Claims:

1. Pyrogenic silicon dioxide powder with
   - a BET surface area of 30 to 90 m^2/g,
   - a DBP index of 80 or less
   - a mean aggregate area of less than 25000 nm^2,
   - a mean aggregate circumference of less than 1000 nm, wherein at least 70% of the aggregates have a circumference of less than 1300 nm.

2. Silicon dioxide powder according to Claim 1, characterised in that the BET surface area is between 35 and 75 m^2/g.

3. Silicon dioxide powder according to Claims 1 or 2, characterised in that the DBP index is between 60 and 80.

4. Silicon dioxide powder according to Claims 1 to 3, characterised in that the BET surface area is between 40 and 60 m^2/g and the DBP index is 60 to 80.

5. Silicon dioxide powder according to Claims 1 to 4, characterised in that the silicon dioxide powder according to the invention has a mean aggregate area of at most 20000 nm^2.

6. Silicon dioxide powder according to Claims 1 to 5, characterised in that the BET surface area is 40 to 60 m^2/g, the DBP index is 60 to 80 and the mean aggregate area is between 15000 and 20000 nm^2.

7. Silicon dioxide powder according to Claims 1 to 6, characterised in that it has a mean aggregate circumference of less than 1000 nm.

8. Silicon dioxide powder according to Claims 1 to 7, characterised in that the BET surface area is 40 to 60 m^2/g, the DBP index is 60 to 80, the mean aggregate

area is 1500 to 20000 nm^2 and the mean aggregate circumference is 600 to 1000 nm.

9. Silicon dioxide powder according to Claims 1 to 8, characterised in that the degree of filling of the powder in an aqueous dispersion is up to 90 wt.%.

10. Silicon dioxide powder according to Claims 1 to 9, characterised in that it has a viscosity of less than 100 mPas, with respect to a 30 wt.% aqueous dispersion, at a rate of shear of 5 rpm.

11. Silicon dioxide powder according to Claims 1 to 10, characterised in that it has a pH, measured in a 4 % strength aqueous dispersion, of between 3.8 and 5.

12. A process for preparing silicon dioxide powder according to the invention in accordance with Claims 1 to 11, characterised in that at least one silicon compound in vapour form, a free-oxygen-containing gas and a combustible gas are mixed in a burner of known construction, this gas mixture is ignited at the mouth of the burner and burnt in the flame tube of the burner, the solid obtained is separated from the gas mixture and optionally purified, wherein

- the oxygen content of the free-oxygen-containing gas is adjusted so that the lambda value is greater than or equal to 1,
- the gamma value is between 1.2 and 1.8,
- the throughput is between 0.1 and 0.3 kg SiO_2/m^3 of core gas mixture,
- the mean, normalised rate of flow of gas in the flame tube at the level of the mouth of the burner is at least 5 m/s.

13. A process according to Claim 12, characterised in that the oxygen content of the free-oxygen-containing gas is not more than 40 vol.%.

14. A process according to Claim 12 or 13, characterised in that $1 < \text{lambda} \leq 1.2$.

15. A process according to Claims 12 to 14, characterised in that $1.6 < \text{gamma} \leq 1.8$.

16. A process according to Claims 12 to 15, characterised in that the mean normalised rate of flow of gas in the flame tube at the level of the mouth of the burner is more than 8 m/s.

17. A process according to Claims 12 to 16, characterised in that the mean rate of discharge of the gas mixture at the mouth of the burner is at least 30 m/s.

18. A process according to Claims 12 to 17, characterised in that additional air (secondary air) is introduced into the flame tube.

19. A process according to Claims 12 to 18, characterised in that silicon tetrachloride and/or at least one organosilicon compound is used as a silicon compound.

20. A process according to Claims 12 to 19, characterised in that

- silicon tetrachloride is used,
- $1 < \text{lambda} \leq 1.2$,
- $1.6 < \text{gamma} < 1.8$,
- the throughput is between 0.1 and 0.3 kg SiO_2/m^3 of core gas mixture,
- in addition at least double the amount of air, with respect to the amount of free-oxygen-containing gas

introduced into the burner, is introduced into the flame tube and

- the rate of flow of feedstocks at the mouth of the burner is 40 to 65 m/s
- and the mean normalised rate of flow of gas in the flame tube at the level of the mouth of the burner is between 8 and 12 m/s.

21. An aqueous dispersion containing the silicon dioxide powder in accordance with Claims 1 to 11.

22. An aqueous dispersion according to Claim 21, characterised in that the concentration of silicon dioxide powder is between 20 and 80, preferably between 40 and 60 wt.%.

23. An aqueous dispersion according to Claims 21 or 22, characterised in that the viscosity of a 50 wt.% dispersion is less than 2500 mPas at a rate of shear of 50 rpm.

24. An aqueous dispersion according to Claims 21 to 23, characterised in that the mean particle size of the silicon dioxide powder is less than 200 nm.

25. An aqueous dispersion according to Claims 21 to 24, characterised in that the dispersion is stabilised by adding bases or cationic polymers or aluminium salts or a mixture of cationic polymers and aluminium salts or acids.

26. An aqueous dispersion according to Claims 21 to 25, characterised in that it contains additives.

27. A process for preparing the aqueous dispersion in accordance with Claims 21 to 26, characterised in that the silicon dioxide powder in accordance with Claims 1 to 4 is incorporated, using a dispersion device, into water

which can be stabilised by adding bases or cationic polymers or aluminium salts or a mixture of cationic polymers and aluminium salts or acids and is then further dispersed for a period of 5 to 30 minutes.

28. A process according to Claim 27, characterised in that a rotor-stator system is used as a dispersing system.

29. Use of the silicon dioxide powder in accordance with Claims 1 to 11 as a filler in rubber, silicone rubber and plastics, for adjusting the rheology in dyes and lacquers and as a support for catalysts.

30. Use of the dispersion in accordance with Claims 21 to 26 to prepare glass items, for chemical-mechanical polishing and for preparing ink-jet papers.